REMARKS/ARGUMENTS

Reconsideration is respectfully requested.

Claims 1-19 and 21-24 are pending before this amendment. By the present amendment, claim 6 is cancelled without prejudice; claims 1, 7, 11 and 15-16 have been amended. No new matter has been added.

The applicants and the applicants' attorney respectfully thank the examiner for discussing and entering the examiner's amendments from a telephonic interview conducted on July 31, 2009.

In the office action (page 3), claim 11 stands objected to because of informalities. In response, the applicants have amended claim 11 to address the antecedent basis issues respectfully pointed out by the examiner. The applicants respectfully submit that amended claim 11 overcomes these antecedent basis issue(s) and is now in compliance. Therefore, withdrawal of the aforementioned objection is respectfully requested.

In the office action (page 4), claims 1-2, 4-6, 8-9, 12-18, 21-22 and 24 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,955,833 (Janning).

The applicants have amended claim 1 (and similarly claim 15) to better clarify the presently claimed invention and to traverse the examiner's rejection.

The present invention describes the formation of the field emission-inducing gate portion 300 and the field emission-suppressing gate portion 200 such that this formation allows the field emission-suppressing gate portion to suppress electrons from being

emitted from the field emitter. Also, the field emission-inducing gate portion 300 is adapted to **induce** electrons for being emitted from the field emitter when an electric field is applied to the metal mesh in a direction of the field emitter. Further, the field emission-suppressing gate portion 200 is adapted to **suppress** electrons from being emitted from the field emitter when an electric field is applied to the field emission-suppressing gate electrode in a direction opposite to the electric field applied to the metal mesh, wherein the field emission-suppressing gate portion is electrically insulated from the field emission-inducing gate portion, which has an insulator with a field emission-suppressing gate opening therein and a field emission-suppressing gate electrode formed on the insulator. Accordingly, in the presently claimed invention the field emission-inducing gate portion formed on top of the field emission-suppressing gate portion having a metal mesh with at least one penetrating hole that surrounds electrons being emitted from the field emitter, and a dielectric layer surrounding the side of the metal mesh in the penetrating hole is adapted to prevent the electrons emitted from the field emitter from directly colliding with the metal mesh. Thus, claim 1 (and similarly claim 15) has been amended to clarify this above described aspect of the presently claimed invention. Claim 1 now recites, inter alia:

> --a field emission-inducing gate portion formed on top of the field emission-suppressing gate portion having a metal mesh with at least one penetrating hole that surrounds electrons being emitted from the field emitter, and a dielectric layer surrounding the side of the metal mesh in the penetrating hole **and adapted to prevent the electrons emitted from the field emitter from directly colliding with the metal mesh**,
>
> wherein ~~**the field emission-suppressing gate portion suppresses electrons from being emitted from the field emitter, and**~~ the field emission-inducing gate portion **is adapted to** ~~**induces**~~ **induce** electrons to be emitted from the field emitter **when an electric field is applied to the metal mesh in a direction of the field emitter, and the field emission-suppressing gate portion is adapted to suppress**

electrons from being emitted from the field emitter when an electric field is applied to the field emission-suppressing gate electrode in a direction opposite to the electric field applied to the metal mesh, and wherein the field emission-suppressing gate portion is electrically insulated from the field emission-inducing gate portion, and has an insulator with a field emission-suppressing gate opening therein, and a field emission-suppressing gate electrode formed on the insulator--.

Nothing in Janning teaches or discloses these limitations of presently amended claim 1 of the present invention.

In contrast, Janning discloses a field emission display device making use of secondary electron emission (Janning, column 5, lines 35-41 and 56-60). According to D1, an enhancement layer (40a) is disposed over at least selected portions of an outer surface of an extraction grid, i.e. a gate electrode, of the device to provide enhanced secondary electron emissions (Janning, abstract). Secondary electron emission refers to a phenomenon that each emitted electron that hits the gate electrode produces several electrons ("secondary electronic emissions" from Wikipedia).

Further in contrast, by comparing Fig. 2 of Janning and Fig. 4 of the present invention and the respective description, it is obvious that the enhanced layer (40a), of Janning is allegedly arranged in the same position as the dielectric layer (330) of the present invention. However, this enhanced layer (40', 40a) of Janning is different from the dielectric layer (330) of the present invention. In order to provide enhanced secondary electron emissions, it is mandatory that the enhanced layer (40a) of D1 is of near monomolecular thickness (Janning, column 5, lines 23-25) and comprises a high secondary electron emission material (Janning, column 5, lines 35-36). Moreover, since secondary electrons are produced when electrons hit the surface of secondary electron emission material, it is desired in Janning to have more electrons colliding with the

metal mesh (26a) or the enhanced layer (40a), e.g. by maximizing the exposure to electrons emanating from the field emitter (Janning, column 5, lines 28-29), which is contrary to the technical effect of the dielectric layer (330) of the present invention described above. As a result, nowhere does Janning teaches or discloses the following distinguishing feature, which firstly recites: –a dielectric layer surrounding the side of the metal mesh in the penetrating hole **and adapted to prevent the electrons emitted from the field emitter from directly colliding with the metal mesh**–.

Furthermore, nowhere does Janning discloses or suggest the limitation of amended claim 1, which secondarily recites inter alia: –**the field emission-suppressing gate portion is adapted to suppress electrons from being emitted from the field emitter when an electric field is applied to the field emission-suppressing gate electrode in a direction opposite to the electric field applied to the metal mesh**–.

Janning illustrates in Fig. 2 such that the cathode electrode (22'), the field emission suppressing gate electrode (the grid 26'), and the field emission-inducing gate electrode (the grid 26a') are marked "+", "-" and "++", respectively, and consequently, the electric field applied to the field emission-suppressing gate portion appears to be in a direction opposite to the electric field applied to the field emission-inducing gate electrode. However, the functionality of the field emission-suppressing gate electrode (the grid 26') of Janning, which can only be taken out of the description, is contrary to that of the present invention: the field emission-suppressing gate electrode is intended to prevent elections emitted from the field emitter in the present invention, but to induce electrons to be emitted from the field emitter in Janning.

According to Janning, Fig. 2 depicts a field emission display device with one or more dynodes or application grids (26a) with near monomolecular enhancement layers (40a) for staged secondary electron emissions (Janning, column 5, lines 56-60).

A dynode is known as one of a series of electrodes within a photomUltiplier tube. It is well-known that each dynode is at a more positive electrical potential than its predecessor so as to provide staged secondary electron emissions: the electrons emitted from the cathode are accelerated toward the first dynode, which is maintained positive with respect to the cathode; each accelerated electron that strikes the dynode surface produces several electrons, that are then accelerated to the second dynode, which is held more positive than the first dynode; by the time this process has been repeated at each of the dynodes, plenty of electrons have been produced for each incident electron ("Dynode" from Wikipedia).

Accordingly, in order to enable staged secondary electron emissions, in Janning the first dynode (26') shall be maintained positive with respect to the cathode (22') and the second dynode (26a') shall be at a more positive electrical potential than the first dynode (26'). Therefore, Janning does not teach or disclose the limitation of claim 1, which secondarily recites inter alia: --**the field emission-suppressing gate portion is adapted to suppress electrons from being emitted from the field emitter when an electric field is applied to the field emission-suppressing gate electrode in a direction opposite to the electric field applied to the metal mesh**--.

With respect to these limitations, which were firstly and secondarily recited in amended claim 1 and discussed above, the technical problem of the present invention is formulated as providing a field emission device capable of effectively reducing a

leakage current flowing into a gate being an electron emission-inducing electrode (specification [21]).

This technical problem is solved by the present invention with the distinguishing limitation, which were firstly and secondarily recited and discussed above, namely that the dielectric layer prevents electrons emitted from the field emitter from directly colliding with the metal mesh, and the field emission-suppressing gate portion acts to suppress electron emission from the field emitter caused by field emission-inducing gate portion (specification [46] and [51]). Nowhere does Janning mention this technical problem at all.

Accordingly, the applicants respectfully submit that there is no teaching in Janning, which would have prompted the skilled person, faced with the objective technical problem, to arrive at the distinguishing limitations of amended claim 1, which were firstly and secondarily recited above and thus achieve what the presently claimed invention achieves.

Lastly, nowhere does Janning teach the limitations of amended claim 1, which recites inter alia: --**wherein the field emission-suppressing gate portion is electrically insulated from the field emission-inducing gate portion, and has an insulator with a field emission-suppressing gate opening therein, and a field emission-suppressing gate electrode formed on the insulator**-- (see Janning FIG. 2 elements 40a, 26a, 28).

Accordingly, the applicants respectfully submit that Janning does not teach or disclose amended claim 1 of the presently claimed invention, which recites inter alia: --a dielectric layer surrounding the side of the metal mesh in the penetrating hole and

adapted to prevent the electrons emitted from the field emitter from directly colliding with the metal mesh --; --the field emission-suppressing gate portion is adapted to suppress electrons from being emitted from the field emitter when an electric field is applied to the field emission-suppressing gate electrode in a direction opposite to the electric field applied to the metal mesh--; and wherein the field emission-suppressing gate portion is electrically insulated from the field emission-inducing gate portion, and has an insulator with a field emission-suppressing gate opening therein, and a field emission-suppressing gate electrode formed on the insulator. Thus, the applicants respectfully submit that claim 1 is in condition for allowance over Janning.

As to claims 2, 4-5, 8-9, 12-14, the applicants respectfully submit that these claims are allowable at least because they depend from claim 1, which is now considered to be in condition for allowance for the reasons above.

In regards to presently independent claim 15, claim 15 recites similar features to those found in claim 1. Therefore, for reasons analogous to those argued above with respect to claim 1, claim 15 is in condition for allowance over the cited references.

As to claims 16-18, 21-22, and 24, the applicants respectfully submit that these claims are allowable at least since they depend from presently claim 15 of the present invention, which is now considered to be in condition for allowance for the reasons mentioned above for presently claim 1 of the present invention.

In the office action (page 9), claims 3, 7 and 23 stand rejected under 35 U.S.C. §103(a) as being obvious over Janning in view of itself.

As to claims 3, 7, and 23, the applicants respectfully submit that these claims are allowable at least because they depend from either claim 1 or claim 15, which are now

considered to be in condition for allowance for the reasons above.

In the office action (page 11), claims 10 and 19 stand rejected under 35 U.S.C. §103(a) as being obvious over Janning in view of U.S. Publication No. 2002/0000771 (Ge). The "et al." suffix is omitted in the Ge reference name.

Applicants respectfully traverse this rejection because GE, either alone or in combination with Janning, fails to disclose or suggest all of the claim limitations. Specifically, claims 10 and 19 are allowable at least since they depend from either claim 1 or claim 15, because GE fails to make up for the deficiencies of Janning for analogous reason mentioned above for claim 1 and for similarly for claim 15, where claim 15 recites similar features to those found in claim 1.

Therefore, applicants respectfully submit that claims 10 and 19 are allowable at least since they depend from either claim 1 or claim 15, which are now considered to be in condition for allowance for the reasons mentioned above for claim 1.

In the office action (page 13), claim 11 stands rejected under 35 U.S.C. §103(a) as being obvious over Janning in view of U.S. Patent No. 5,850,120 (Okamoto).

Applicants respectfully traverse this rejection because Okamoto, either alone or in combination with Janning, fails to disclose or suggest all of the claim limitations. Specifically, claim 11 is allowable at least since it depends claim 1, because Okamoto fails to make up for the deficiencies of Janning for claim 1 from reasons mentioned above for claim 1.

Therefore, applicants respectfully submit that claim 11 is allowable at least since is depends from claim 1, which is now considered to be in condition for allowance for

the reasons mentioned above for claim 1.

For the reasons set forth above, the applicants respectfully submit that claims 1-5, 7-19 and 21-24, now pending in this application, are in condition for allowance over the cited references. Accordingly, the applicants respectfully request reconsideration and withdrawal of the outstanding rejections and earnestly solicit an indication of allowable subject matter.

This amendment is considered to be responsive to all points raised in the office action. Should the examiner have any remaining questions or concerns, the examiner is encouraged to contact the undersigned attorney by telephone to expeditiously resolve such concerns.

Respectfully submitted,

Dated: November 18, 2009

Keith S Van Duyne

Keith S. Van Duyne, Reg. No. 54,505
Ladas & Parry LLP
224 South Michigan Avenue
Chicago, Illinois 60604
(312) 427-1300